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PNS/FDA 27 (2010) (English): Recommended Code of Practice for the Processing and Handling of Smoked Fish



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PHILIPPINE NATIONAL STANDARD

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**Recommended code of practice for the
processing and handling of smoked fish**

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BUREAU OF PRODUCT STANDARDS

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Foreword

The Philippine National Standard for Smoked fish and the Recommended Code of Practice for the Processing and Handling of Smoked fish were drafted simultaneously under the project entitled "Development of Standards for Ethnic Foods", reviewed by the Commodity Working Group (CWG) and Food Standards Technical Committee (FSTC) and were endorsed for adoption as Philippine National Standard and Recommended Code of Practice by the Food and Drug Administration.

The standard and recommended code of practice were developed through gathering of baseline information which included survey on existing practices of the smoked fish processors and analysis of their products. Public consultation workshops were held in the Department of Science and Technology compound and in Rosario, Cavite where the smoked fish production is well-known.

The Philippine National Standard and Recommended Code of Practice were developed to set the high standard of the product to make it more competitive in the world market, to have guide for the assurance of its quality and safety and ensure fair practices in the food trade.

Recommended code of practice for the processing and handling of smoked fish

1 Scope

This Code of Practice is a set of recommended procedures that shall be adopted by processors of smoked fish to enable their products to conform to the Philippine National Standard for Smoked Fish (PNS/FDA 26:2010).

This code provides a guide in the production, storage and handling of smoked fish necessary to maintain their safety and quality from the receipt of raw materials and ingredients up to distribution.

2 References

The titles of the standard publications referred to in this standard are listed on the inside back cover.

3 Definition of terms

For the purpose of this Code, the following definitions shall apply:

3.1**artificial drying**

it is drying by means of mechanically circulated air where the temperature, humidity and volumetric flow rate may be controlled

3.2**brining**

it means the process of placing fish in a solution of food grade salt (sodium chloride) in water for a period of sufficient length for the fish tissue to absorb a significant quantity of salt (Codex RCP, 1999)

3.3**chilled fish**

it is fresh fish, which has been stored at a temperature not exceeding 4°C

3.4**chilling**

it is the process of cooling fish thoroughly to a temperature approaching that of melting ice (Codex RCP for Smoked Fish, 1979)

3.5**cleaning**

refers to the removal of objectionable matter from surfaces (Codex RCP for Smoked Fish, 1979)

3.6

cold smoking

it means smoking of fish at temperatures wherein the product does not show any signs of heat coagulation of the protein (Codex RCP for Smoked Fish, 1979)

3.7

container

it means any form of packaging material, which completely or partially encloses the food (including wrappers). A container may enclose the food as a single item or several units or types of prepackaged food when such is presented for sale to the consumer

3.8

contaminants

these are any biological or chemical agent, foreign matter, or other substances that are not intentionally added to food, which may compromise food safety or suitability

3.9

contamination

it is any direct or indirect transmission of objectionable substances to the fish

3.10

disinfection

it is the direct application of chemical or physical agents and processes to eliminate pathogenic or disease-causing microorganisms

3.11

food

it is any substance, whether processed or semi-processed or raw which is intended for human consumption and including beverages, chewing gum and any substance, which has been used as an ingredient on the manufacture, preparation or treatment of food

3.12

food additive

it refers to any substance not normally consumed as a food by itself and not normally used the intended use of which results or may reasonably be expected to result, directly or indirectly, in its becoming a component or otherwise affecting the characteristics of any food (including any substance intended for use in producing, manufacturing, packing, processing, preparing, treating, packaging, transporting, or holding food; and including any source of radiation intended for any such use), if such substance is not generally recognized, among experts qualified by scientific training and experience to evaluate its safety, as having been adequately shown through scientific procedures to be safe under the conditions of the intended use. (BFAD BC 2006-016)

3.13

food standard

it is a regulatory guideline that defines the identity of a given food product (i.e. its name and the ingredients used for its preparation) and specifies the minimum quality factors and, when necessary, the required fill of container. It may also include specific labeling requirements other than or in addition to the labeling requirements generally applicable to all prepackaged foods

3.14

fresh fish

it is freshly caught fish, which has received no treatment other than chilling

3.15

filleted smoked fish

it is smoked fish made from fish loins which have been deboned

3.16

good manufacturing practice (GMP)

it is a quality assurance system aimed at ensuring that products are consistently manufactured, packed, repacked or held to a quality appropriate for the intended use. It is thus concerned with both proper manufacturing and quality control procedures

3.17

hot smoking

it means smoking of fish at temperatures for a sufficient period of time to obtain heat coagulation of the protein throughout. (Codex RCP for Smoked Fish, 1979)

3.18

hazard analysis and critical control point (HACCP)

it is a preventive food quality management system, which identifies, evaluates and controls the hazards significant to food safety specific to a product

3.19

ingredient

it is any substance including food additive, used as a component in the manufacture or preparation of a food and present in the final product in its original or modified form

3.20

iodized salt

it is a food grade quality salt that meets the purity requirements of standards for iodized salt per Republic Act (R.A.) No. 8172

3.21

label

it includes any tag, brand, mark, pictorial, or other descriptive matter, written printed, marked, embossed or impressed on, or attached to a container of food

3.22

labeling

it means any written, printed or graphic matter (1) upon any article or any of its container or wrappers or (2) accompanying the packaged food

3.23

lot

it is food produced during a period of time and under more or less the same manufacturing condition indicated by a specific code

3.24

natural drying

it refers to the drying of fish by exposure to open air

3.25

packaging

it is the process of packing that is part of the production cycle applied to a bulk product to obtain the finished product. Any material, including painted material, employed in the packaging of a product including any outer packaging used for transportation of shipment. Packaging materials are referred to as primary or secondary according whether or not they are intended to be in direct contact with the product

3.26

prepackaged

it means packaged or made up in advance in a container, ready for sale to the consumer (BFAD Rules and Regulation Governing the Labeling of Prepackaged of Food Products Distributed in the Philippines, 1984)

3.27

processed food

it shall refer to food that has been subjected to some degree of processing (e.g. milling, drying, concentration and canning, etc.), which partially or completely change the physico-chemical and/or sensory characteristics of the raw material

3.28

processing

it is the part of a production cycle starting from weighing of raw materials to the obtaining of a bulk product

3.29

processing plant

it is the building or buildings, or portions thereof used for the manufacture and storage of dried fish for human consumption

3.30

reduced oxygen packaging (ROP)

it means packaging that reduces the amount of oxygen in a package by mechanical evacuation of the oxygen, displacing the oxygen with another gas or combination of gases, or otherwise controlling the oxygen content in a package to a level below the level of 21% normally found in the surrounding atmosphere. This includes altered atmosphere, modified atmosphere, controlled atmosphere, low oxygen and vacuum packaging. (Regulation for Smoked Fish, State of Michigan Department of Agriculture Regulation No. 569, 1968)

3.31**salinometer**

it is also known as brinometer. It is a device that measures the approximate salt concentration in the brine. In a saturated brine, the stem will be almost entirely above the level of the salt solution and read 100°S (salinity approximately 23% salt solution). In weaker brines more of the stem will be submerged (based on Codex RCP for Smoked Fish, 1979)

3.32**smoke**

it means wood (including dust) or woody plants in the natural state by combustion or friction, excluding wood or plants which have been impregnated, colored, gummed or painted or treated in a similar manner. The raw material used for the generation of smoke shall be free from extraneous materials such as plastic. The term "smoke" shall include derivatives obtained by condensation or absorption of smoke in a suitable food grade liquid. A dip, which can impart a smoky flavor to fishery products, can be prepared by diluting an appropriate quantity of the absorbed condensate in potable water (Codex RCP for Smoked Fish, 1979)

3.33**smoked fish fillet**

it is smoked fish made from fresh fish cut parallel to the central bone of the fish wherein the fins, main bones and sometimes belly flaps are removed

3.34**smoking**

it is the traditional process of treating fish by exposing it to the smoke from burning or smoldering plant materials [or smoke concentrates (liquid smoke) derived from burning or smoldering plant materials]. The traditional process is characterized by an integrated combination of salting, drying, heating and smoking steps in a smoking chamber (kiln) (Codex Proposed Draft Standard for Smoked Fish, 2008)

3.35**split smoked fish**

it is smoked fish prepared from fish that has been cut along the dorsal side from the base of the tail to the tip of the head with the internal organs and gills removed

3.36**vacuum packaging**

it is a method of packaging where the air is withdrawn from the primary package (Soroka, 1999)

3.37**water phase salt (WPS)**

it is the concentration of salt in the water portion of the fish flesh required to inhibit the potential growth and toxin formation of *Clostridium botulinum* (Compendium of Fish and Fishery Product Processes, Hazards, and Controls: Smoked Fish and Fishery Products, Seafood Information Network, Univ. of California – Davis. August 26, 2002)

3.38**whole smoked fish**

it is fish smoked in its original form, which has not been cut and may or may not have been eviscerated, and with scales intact

4 Ingredients and packaging material requirements**4.1 Ingredients****4.1.1 Basic ingredients**

4.1.1.1 Raw materials (Fish) – shall be sound and wholesome, fresh, chilled or frozen fish, and fit for human consumption. The fish is obtained or prepared from any of the species listed but not limited to those in Annex A - Species of finfishes utilized in the production of smoked fish.

4.1.1.2 Salt - shall be of food grade quality and meets the requirements and standards for iodized salt as per R.A. No. 8172: An Act Promoting Salt Iodization Nationwide and for Related Purposes (Annex B).

4.1.1.3 Water - shall be water fit for human consumption and meets the potability requirements prescribed in the Philippine National Standards for Drinking Water as per DOH Administrative Order No. 2007-0012 (Annex C)

4.1.2 Optional ingredients

All other ingredients used shall be of food grade quality and conform to all applicable standards, which may include, but not limited to the following:

4.1.2.1 Seasonings and condiments;

4.1.2.2 Spices; and

4.1.2.3 Liquid smoke or smoke flavor

4.1.3 Smoking materials

Wood chips, wood shavings, sawdust and other cellulosic plant materials may be used as smoking materials. These should be sufficiently dry, clean and free from and harmful substances such as wood preservatives, lubricants and paints. Visible microbiological or fungal growth shall not be present. Soft resinous wood should not be used because it gives the smoked product an unpleasant acrid and bitter taste

4.1.4 Food additives

Food additives when used shall be in accordance with the regulations prescribed by the Bureau of Food and Drugs (BFAD) under Bureau Circular No. 016, s.2006: Updated List of Food Additives) and/or by the Codex Alimentarius Commission. The food additives listed but not limited to those in Table 1 may be used for the manufacture of smoked fish.

Table 1 – Food additives for smoked fish (BFAD B.C. No. 016, s. 2006: Updated list of food additives)

| Food additive | Maximum level |
|---|----------------------|
| a. Antioxidant | |
| Butylated hydroxyanisole (BHA) | 200 mg/kg |
| Butylated hydroxytoluene (BHT) | 200 mg/kg |
| Tertiary butyl hydroquinone (TBHQ) | 250 mg/kg |
| b. Preservative | |
| Sorbic acid (as potassium, sodium and calcium sorbates) | 200 mg/kg |
| Sodium/Potassium nitrite | 134mg/kg |
| *Based on the Food Category System: 09.2.5 - Smoked, dried, fermented, and/or salted fish and fish products, including mollusks, crustaceans, and echinoderms | |

All other food additives not included in the above list shall be allowed as carry-over, provided they are approved by the BFAD regulation and shall be in accordance to Section 5.2 of the "Principle Relating to the Carry-Over of Food Additives into Foods" (CAC/Vol. 1, 1991).

4.2 Packaging materials

The packaging materials should be appropriate for the product to be packed and for the expected conditions of handling during distribution and storage. These should provide adequate protection from contamination for the products and should be sufficiently durable to withstand mechanical, chemical and thermal stresses encountered during processing and normal distribution. All packaging materials must be clean and free from defects that may affect the product or package integrity. These shall be stored in a clean and sanitary manner.

5 Hygiene

It is recommended that the product covered by the provisions of this code of practice be prepared and handled in accordance with the appropriate sections of the **Recommended International Code of Practice – General Principles of Food Hygiene (CAC/RCP 1–1969, Rev 4 (2003), Recommended International Code of Practice for Smoked Fish (CAC/RCP 25-1979)** and/or the **BFAD A.O. No. 153 s. 2004 - Guidelines, Current Good Manufacturing Practices in Manufacturing, Packing, Repacking or Holding Food**, covering the plant facilities and operations requirement including the construction and layout of processing plant, hygienic facilities, equipment, utensils and working surfaces.

6 Preparation and processing

The production of smoked fish is described from the receipt of raw materials up to product storage. The production process should be supervised by personnel with adequate technical training and experience.

6.1 Preparation of ingredients

6.1.1 General requirements.

All raw materials (fish) and ingredients must be safe for human consumption and free from spoilage and contamination. Whenever applicable, certificates of analyses (COA) from ingredient suppliers shall be secured to confirm their suitability for processing. No ingredients, which have indications of deterioration, decomposition or contamination to an extent which renders them unfit for human consumption, shall be used for processing. Stored stocks of ingredients should be used on a first in - first out (FIFO) basis. Ingredients that do not conform to the requirements of Sub-section 4.1 (Ingredient) shall be rejected.

6.1.2 Receipt of basic ingredients

All basic ingredients must be carefully inspected before use and must meet the following requirements:

6.1.2.1 Fish shall be accepted only if they conform to 4.1.1.1. Those that show signs of deterioration shall not be used. These include fish, which are damaged (bruised, crushed and mutilated) and those that indicate the presence of parasites.

Only fresh and/or frozen fresh fish shall be used for processing. Fresh fish should be kept well iced until they reach the processing plant. The temperature of the fish shall not exceed 4°C prior to processing.

Frozen fish for smoking should have been frozen prior to storage at -18°C or lower.

The freshness of fish is generally evaluated based on its appearance, odor and texture. Annex D provides the comparative description of the sensory characteristics of fresh and stale fish. The fish shall be inspected and sorted according to quality.

6.1.2.2 Salt shall conform to 4.1.1.2. It shall be pre-packaged, iodized, refined or unrefined in the form of coarse or fine white crystals without any dirt, sand or other foreign matters.

6.1.2.3 Water shall conform to 4.1.1.3. It shall be obtained only from reliable sources, with adequate supply at all times. It should be clear and, free from any objectionable color, odor or taste.

6.1.3 Receipt of optional ingredients

All optional ingredients shall be inspected before use. They must be packaged properly and free from any signs of quality deterioration, decomposition or contamination such as excessive discoloration, mold growth, insect infestation, caking and presence of foreign matters.

6.2 Processing operations

6.2.1 General requirements

The manufacture of smoked fish shall use standardized formulation and process required to achieve the safety and quality criteria as prescribed in Section 5.2 of the Standards for Smoked Fish (PNS/FDA 26:2010). Any modifications introduced must be tested and validated prior to adoption in commercial processing.

6.2.2 Processing operation requirements

Annexes F and G show the general processes for cold smoked and hot smoked fish, respectively.

The fish should be processed immediately after receipt. Fish that cannot be immediately processed should be promptly stored in ice or preferably refrigerated or chilled, pending processing. Frozen fish may be thawed in water, still air at room temperature or air blast thawing. The temperature of the water to be used for thawing should not be high enough to cause coagulation of the fish proteins.

6.2.2.1 Washing, splitting and evisceration or cutting

The fish should be thoroughly washed and eviscerated or gutted immediately as required.

- a) For split type smoked fish, the fish should be split into butterfly fillets, by cutting along the dorsal side of the fish from the base of its tail to the tip of its head. The fish should be split open and the gills and internal organs removed. The remaining traces of internal organs and blood in the peritoneal lining should be scraped and washed thoroughly. The cleaned fish should be allowed to drain.
- b) For whole uneviscerated, hot smoked fish, no splitting or cutting is required. The fish should be washed and drained prior to salting, cooking and smoking.
- c) For whole, eviscerated smoked fish, a small incision should be made on the belly and the entrails are carefully pulled out through the opening made. The gills are also carefully removed without detaching the head from the body. The eviscerated fish is then thoroughly washed and drained.
- d) For filleted type smoked fish, the fish is eviscerated and the loin meat portion of the fish is separated by cutting the fish parallel to the central bones. The skins, bones, fins and belly flaps are then removed.

For fish that are not to be brine salted, proceed to surface drying (Section 6.2.2.5) after washing, if necessary.

6.2.2.2 Salting or brining

a) Preparation of brine or salt solution for brining and/or cooking

Brine of required concentration should be prepared by dissolving a corresponding amount of salt in a given amount of water. Appropriate amounts required to be dissolved in a given quantity of water to achieve specified concentrations is given in Annex E.

Brine strength should be checked with a salinometer (brinometer) and its strength maintained at the required concentration either through the appropriate addition of more salt or by dilution with water.

b) Soaking fish in brine

The fish should be completely covered by the brine to ensure even salt penetration. The brining period shall depend on the size of fish used. Weights or sinkers may be placed on top of the fish to keep the fish fully immersed in the brine. The brining vat should be properly covered to prevent contamination.

Brining of fish may be done at low temperature in a cold room or with the addition of small quantity of ice to the brine to prevent increase in histamine content of the fish.

The brine may be reused for succeeding batches only in a day's operation provided that the brine strength is adjusted to the required concentration. The spent brine should be replaced after a day's operation to prevent the excessive accumulation of fatty scum and build-up of precipitated sludge made up of undissolved salt crystals, insoluble salt components, fish residues and other foreign matters. These impurities can contaminate the succeeding batches of fish in subsequent brining and affect the quality of their final product.

c) Dry salting

The salt to fish ratio should be controlled during dry salting. For lightly salted fish, the amount of salt to fish range from 1 part of salt 8 parts of fish by weight, whereas heavily salted range from 1 part salt to 3 parts fish by weight. The duration of the salting period depends on the preferred saltiness of the finished product.

6.2.2.3 Rinsing the fish after brining

After brining or dry salting, the fish should be removed from the salting vat, rinsed and drained. This prevents salt crystals from forming on the surface of the product after drying. For cold smoked fish, proceed to 6.2.2.8 (Smoking)

6.2.2.4 Surface drying of fish (for hot smoked fish)

The fish may be immediately laid on drying trays and dried either by sun-drying or using a mechanical dryer. The drying process is adequate when the fish surface is completely dry. Surface drying is done to firm up the fish flesh and prevent loosening of the skin during cooking in brine.

During sun drying, the fish should be protectively covered with nylon nets of appropriate mesh size to protect the fish from insects throughout the drying period.

The mechanical dryer should be capable of maintaining the desired temperature (40°C-50°C) during drying.

6.2.2.5 Cooking in brine (for hot smoked fish)

The partially dried fish may then be cooked in boiling brine until fully cooked. The fish should be completely immersed in the brine to ensure even cooking. The duration of the cooking depends on the size of fish used. Any scum that forms on the surface of the cooking brine should be removed to prevent it from adhering to the fish surface.

The cooking brine may be re-used, for succeeding batches on the same day, provided that the brine strength is appropriately adjusted to the required concentration either by adding more salt or by dilution with water.

6.2.2.6 Rinsing and draining of cooked fish (for hot smoked fish)

The fish should be removed from the cooking vat and gently rinsed with clean water to remove surface salt and other adhering matters. The fish is then allowed to drain.

6.2.2.7 Surface drying of cooked fish (for hot smoked fish)

The cooked fish may be surface dried either under the sun or in a suitable mechanical dryer as in 6.2.2.4. Surface drying is necessary for the formation of a glossy pellicle (protein coating) on the surface of the fish, which helps to seal in the natural juices and flavors and forms a smooth and attractive surface upon which the smoke can be evenly deposited.

6.2.2.8 Smoking

Fish for smoking are laid on smoking trays and transferred to appropriate smokehouse where smoke is already being generated. The smoking time and temperature should be controlled throughout the smoking process. A calibrated dial thermometer should be installed in the smokehouse to monitor the temperature of smoke. An accurate timing device with alarm is also recommended.

Hot smoking temperatures ranging from 70°C to 90°C should be sufficient to allow the complete coagulation of proteins in the fish. On the other hand, cold smoking temperature ranging from 30°C to 60°C should be controlled to ensure even smoking of the fish and prevent heat coagulation of protein. During cold smoking, the relative humidity of the smoking chamber should be controlled to prevent case hardening and poor smoke deposition.

The fish should be properly spaced in between during smoking to maximize smoking tray area and allow uniform smoke deposition.

6.2.2.9 Cooling of smoked fish

Hot smoked fish should be immediately cooled to at least ambient temperature (28°C-30°C) by air cooling before packing.

Enough cooling time should be allowed to bring the inside temperature of the fish sufficiently cool for packaging. Packing inadequately cooled fish may result in the condensation of moisture and make the product prone to souring or molding. On the other hand, cooling too slowly may promote the growth of spoilage microorganisms.

6.2.2.10 Sorting of smoked fish

The smoked fish should be properly sorted according to quality prior to packing. Defective products should be segregated and rejected.

6.2.2.11 Packaging of smoked fish

The appropriate packaging material for both hot and cold smoked fish depends on the salt content, as water phase salt (WPS) of the fish (Annex H). Air packed products or those products packed in the presence of oxygen at normal environmental conditions should contain at least 5.0% WPS. Packaging materials used may be of pre-formed single film polyethylene (PE) of at least 0.003 inch thickness for air packed products and, either transparent or opaque laminated/multilayer films (like composites of PET or polyethylene terephthalate, metal foil, PE or Nylon) for vacuum packed products.

Products packed under reduced oxygen packaging like vacuum packaging should have a minimum of 3.5% WPS to prevent the growth of *Clostridium botulinum*, a pathogenic organism which produce a potent toxin in an anaerobic condition. Vacuum packages are usually pre-formed plastic film laminates that can withstand frozen storage conditions. A vacuum sealing machine is used to evacuate air in the filled package prior to sealing

Retail packs of both hot and cold smoked fish may be packed in secondary packages made of carton boxes for storage and distribution. Individually packaged products may also be placed in secondary packaging material like pre-formed cardboard boxes, and then packed in distribution packages made of carton boxes.

6.2.2.12 Storage of smoked fish

Table 2 presents the recommended storage conditions for hot and cold smoked fish of specific water phase salt content (WPS) using reduced oxygen package, including vacuum packaging, and those air packed products.

Table 2 – Recommended water phase salt content (WPS) for hot and cold smoked fish with varying storage conditions and packaging conditions

| Storage condition | Water phase salt (WPS) required | |
|--|---------------------------------|-----------------------------------|
| | Reduced oxygen packed | Air packed |
| Ambient condition (28°C - 32°C) (very limited storage) | Not recommended | ≥ 5.0 % (hot smoked fish only) |
| Chilling storage (≤ 5°C) | ≥ 3.5 % | ≥ 3.5 % |
| Frozen storage (≤ 18°C) | None | None |

Annex H provides the calculated water phase salts (WPS) at different moisture and salt contents.

Frozen products should be kept frozen until required for consumption.

6.3 Coding of packed products

Coding of packed products in sealed containers shall be made with indelible markers with information details of production, date, batch code, product code, the product line in which the product was packed and other information necessary for product traceability. Whenever the container does not permit the code to be embossed or inked, the label shall be legibly perforated or otherwise marked, and securely affixed to the product package.

6.4 Post-process container handling

Care must be exercised in the handling and distribution of retail or bulk packaged smoked fish or as to prevent mechanical damage and spoilage to the products.

7 Labeling

7.1 General requirements

All processed products shall be inspected before labeling and casing. All containers of packaged products shall be properly labeled. The label shall conform to current BFAD labeling requirements and shall contain the following information:

7.1.1 The name of the product. The name of the product shall be "Cold Smoked Fish" or "Hot Smoked Fish" or "Smoked Fish", in which the word fish may be replaced by the corresponding English or common name of the fish species (e.g., Smoked Milkfish, Hot Smoked Milkfish, Cold Smoked Milkfish, Cold Smoked *Bangus*, or Hot Smoked *Bangus*). The local generic product name for hot smoked fish, which is ***tinapa***, may also be used.

7.1.2 The name and the address of the manufacturer, packer, distributor, importer, exporter or vendor of the food.

7.1.3 The complete list of ingredients and food additives used in the preparation of the product in descending order of proportion.

7.1.4 The net content by weight in the metric system. Other systems of measurement required by importing countries shall appear in parenthesis after the metric system unit.

7.1.5 The words "Best/"Consume Before/"Use by date" indicating end of period at which the product shall retain its optimum quality attributes at specified storage conditions.

7.1.6 Storage instructions like "Keep Refrigerated", Keep Frozen" or Keep Chilled".

7.1.7 Lot identification marked in code identifying the product lot.

7.1.8 The words “Product of the Philippines” or the country of origin if imported.

7.1.9 Additional requirements

A pictorial representation of the fish on the label should not mislead the consumer with respect to the fish so illustrated.

7.2 Labeling of non-retail, bulk containers

The name of the product, lot identification code and the name and address of the manufacturer or packer shall appear in the container. However, the name and address of the manufacturer may be replaced by identification marks provided that such mark is clearly identified with accompanying documents.

7.3 Nutrition labeling

Nutrition labeling shall conform to established regulations by the BFAD.

8 Quality assurance

8.1 Inspection of finished products

All processed products shall be inspected and should pass the quality criteria prescribed in Section 5 of the Philippine National Standard for Smoked Fish and the type of defects, as defined in Section 6, in the lot examined must not exceed the acceptable number based on the appropriate sampling plan ((FAO/WHO Codex Alimentarius Sampling Plans for Prepackaged Foods - CAC/RM 42-1969, Codex Alimentarius Volume 13, 1994).

8.2 Record keeping

Permanent and legible dated records of production batches, code marks and other pertinent details shall be kept concerning each load. Such records are essential as a check on processing operations.

Written records of all package examinations shall specify the code lot and the date of package inspections, the measurements obtained and all the corrective actions taken.

Records identifying initial distribution of the finished product to facilitate, if necessary, the segregation of specific food lots that may have been contaminated or otherwise unfit for intended use, shall be kept and maintained.

All process deviations involving failure to satisfy the minimum requirements of the process shall be recorded detailing those deviations and the actions taken

8.3 Hazard analysis and critical control points (HACCP)

Appropriate HACCP plan must be developed for the product. Prior to the development of HACCP plan, establishments shall have developed, documented and implemented prerequisite programs (PRPs) based on BFAD's Current Good Manufacturing Practices (cGMP) and Hygiene Control. Guidelines for the Application of the Hazard Analysis Critical Control Point (HACCP) System (CAC/GL 18-1993) present the recommended sequence and document formats for the application of the HACCP systems.

9 Storage and transport of finished product

Storage and transport conditions of the finished product shall be such that the integrity of the product container is protected, and the safety and quality of the product are not adversely affected.

Cases and cartons must be thoroughly dry. They must be of proper size so that the containers fit snugly and are not subject to damage from movement within the case. They must be strong enough to withstand normal transport and distribution conditions.

Extreme temperature fluctuations, during storage and transport of the product must be avoided to prevent product deterioration.

10 Laboratory control procedures

Each food processing establishment shall have access to laboratory analyses and control of both the processes used and the finished products. All food ingredients and food products declared unfit for human consumption by the laboratory shall be rejected.

Representative samples for each lot or batch shall be randomly taken to assess the safety and quality of the product.

The Microbiological laboratory shall be separated from the processing area. No pathogens shall be handled within the premises of the manufacturing plant.

Laboratory procedures for quality control of the processes and the product must follow recognized or standard methods for easy interpretation and recognition of the results.

11 End product specifications

Appropriate methods shall be used for sampling and analyses of Smoked Fish to meet the following specifications:

11.1 To the extent possible in good manufacturing practices, the products shall be free from any objectionable matter and parasites harmful to humans.

11.2 The product shall be free from micro-organisms in amounts harmful to humans and should not contain any substances originating from micro-organisms in amounts which may represent a hazard to health.

11.3 The product shall be free from chemical contaminants in amounts which may represent hazard to health.

11.4 The product shall comply with the requirements set forth by the Bureau of Food and Drugs (BFAD) and the Codex Alimentarius Commission on Pesticide Residues and Food Additives.

Annex A

Species of finfishes utilized in the production of smoked fish

| English name | Local name | Scientific name |
|---|----------------------------|--------------------------------|
| I. Mackerel and tuna species | | |
| 1. Short bodied mackerel | <i>Hasa-hasa</i> | <i>Rastrelliger brachysoma</i> |
| 2. Indian mackerel | <i>Alumahan</i> | <i>Rastrelliger kanagurta</i> |
| 3. Striped mackerel | <i>Alumahan</i> | <i>Rastrelliger kanagurta</i> |
| 4. Narrow-barred Spanish mackerel | <i>Tanigue, tanguigi</i> | <i>Scomberomorus commerson</i> |
| 5. Bullet tuna | <i>Tulingan</i> | <i>Auxis rochei</i> |
| 6. Frigate tuna | <i>Tulingan</i> | <i>Auxis thazard</i> |
| 7. Yellowfin tuna | <i>Tambakol, bariles</i> | <i>Thunnus albacares</i> |
| 8. Skipjack tuna | <i>Gulyasan, bariles</i> | <i>Katsuwonus pelamis</i> |
| II. Sardine species | | |
| 9. Smooth belly sardinella | <i>Tamban</i> | <i>Amblygaster leiogaster</i> |
| 10. Indian oil sardines | <i>Tamban</i> | <i>Sardinella longiceps</i> |
| 11. Fringe scaled or fimbriated sardines | <i>Tunsoy</i> | <i>Sardinella fimbriata</i> |
| 12. White sardinella | <i>Tunsoy</i> | <i>Sardinella albella</i> |
| 13. Round sardinella | <i>Lapad</i> | <i>Sardinella aurita</i> |
| 14. Spotted sardinella | <i>Tamban, tunsoy</i> | <i>Amblygaster sirm</i> |
| 15. Freshwater sardines | <i>Tawilis</i> | <i>Sardinella tawilis</i> |
| III. Scad species | | |
| 16. Short finned scad or round scad | <i>Galunggong</i> | <i>Decapterus macrosoma</i> |
| 17. Japanese scad | <i>Galunggong</i> | <i>Decapterus maruadsi</i> |
| 18. Mackerel scad | <i>Galunggong</i> | <i>Decapterus macarellus</i> |
| 19. Big-eyed scad | <i>Matangbaka</i> | <i>Selar crumenophthalmus</i> |
| IV. Mullet species | | |
| 20. Flathead grey mullet | <i>Banak</i> | <i>Mugil cephalus</i> |
| 21. Blackfinned mullet | <i>Kapak</i> | <i>Mugil meloneterus</i> |
| V. Other commercial marine species | | |
| 22. Crevalle | <i>Salay-salay</i> | <i>Caranx leptolepsis</i> |
| 23. Shortfinned or chacunda gizzard | <i>Kabasi</i> | <i>Anodontostoma chacunda</i> |
| 24. Fusilier, Golden Caesio | <i>Dalagang bukid</i> | <i>Caesio spp.</i> |
| 25. Lizardfish | <i>Kalaso</i> | <i>Saurida tumbil</i> |
| 26. Manila sea catfish | <i>Kanduli</i> | <i>Arius manilensis</i> |
| 27. Longfin trevally | <i>Talakitok</i> | <i>Caranoides armatus</i> |
| 28. Big-eyed barracuda | <i>Torsillo, barracuda</i> | <i>Sphyrna barracuda</i> |

| English name | Local name | Scientific name |
|---|--------------------------|--------------------------------|
| VI. Freshwater and Brackish water species | | |
| 29. Catfish | <i>Hito</i> | <i>Clarias bathracus</i> |
| 30. Bengal eel | <i>Palos</i> | <i>Ophisternon bengalense</i> |
| 31. Common carp | <i>Karpa</i> | <i>Cyprinus carpio carpio</i> |
| 32. Fleshysnout catfish | <i>Kanduli</i> | <i>Arius dispar</i> |
| 33. Freshwater sardinella/sardines | <i>Tawilis/Hawo-hawo</i> | <i>Sardinella tawilis</i> |
| 34. Giant gourami | <i>Goramy</i> | <i>Osphronemus goramy</i> |
| 35. Goldie river mullet | <i>Banak</i> | <i>Cestraeus goldiei</i> |
| 36. Milkfish | <i>Bangus</i> | <i>Chanos chanos</i> |
| 37. Mozambique tilapia | <i>Tilapia</i> | <i>Oreochromis mossambicus</i> |
| 38. Nile tilapia | <i>Tilapia/Pla-pla</i> | <i>Oreochromis niloticus</i> |
| 39. Sharp-nosed river mullet | <i>Banak</i> | <i>Cestraeus oxyrhincus</i> |
| <p>Reference:</p> <p>Ganaden, S.R. and F. Lavapie-Gonzalez. 1999. Common and Local Fishes Names of Marine Fishes of the Philippines. Bureau of Fisheries and Aquatic Resources, Philippines. 386 pp.</p> | | |

Annex B

Standard for iodized salt

1. Scope

This standard applies to iodized salt used as condiment or an ingredient in the preparation of food in households, food service and food manufacturing establishments.

2. Description

Iodized salt is food grade salt that contains the prescribed level of iodine. It shall be produced refined or unrefined (crude) salt obtained from underground rock salt deposits or by evaporation of seawater or natural brine. The finished product shall be in the form of solid crystal or powder, white in color, without visible spots of clay, sand, gravel or other foreign matter.

3. Iodization process

3.1 Salt may be iodized with potassium iodate (KIO_3) or potassium iodide (KI) by means of any of the following methods:

- a) dry mixing of salt in powdered form
- b) dip feeding or spray mixing if salt is in crystal form
- c) submersion of ice crystals in iodated brine

4. Essential composition and quality factors

To ensure the stability of iodine, salt to be iodized must conform with the following quality requirements:

| | |
|--------------------------------|--|
| Moisture, minimum | 4 % for refined salt 7 % for unrefined salt |
| NaCl minimum | 97 % dry basis |
| Calcium and magnesium, maximum | 2 % |
| Water insolubles, maximum | 0.2 % |
| Heavy metal contaminants | |
| Arsenic as As | 0.5 mg/kg |
| Cadmium as Cd | 0.5 mg/kg |
| Lead as Pb | 2.0 mg/kg |
| Mercury as Hg | 0.1 mg/kg |

4.1 Naturally present secondary products and contaminants in raw salt

Notwithstanding the purity requirements in section 4.1. the raw salt may naturally contain secondary products, which are present in varying amounts depending on the origin and method of production of salt, and which are composed mainly of calcium, potassium, magnesium and sodium sulphates, carbonates, bromides and of calcium, potassium chlorides as well as natural contaminant may also be present in amounts varying with the origin and method of production of the salt.

5. Labelling

5.1 Iodized salt for commercial distribution shall carry appropriate labelling in accordance with BFAD rules and regulations on labelling of prepackaged foods. Specifically, the following information shall be declared in every container of iodized salt whether in bulk or retail package.

5.1.1 For locally produced iodized salt

- a) The name of the product, "IODIZED SALT", printed in bold capital letters
- b) Name and address of manufacturer
- c) Net weight
- d) Iodine compound used
- e) Chemical additives, e.g. anti-caking agents, emulsifiers
- f) Open date marking, e.g. "Best Before" or "Consume Before" Date
- g) Lot identification code (replacers must use manufacturer's lot i.d code)
- h) Storage Instruction: STORE IN COOL DRY PLACE

5.1.2 For imported iodized salt

- a) same as 5.1.1 (a), (c) to (h)
- b) Name and address of Importer/Local Distributor
- c) Country of Origin

5.2 Labelling of non-retail containers

In the case of non-retail containers of at least 25 kg of iodized salt, the labelling information required in sections 5.1.1. (b), (d) or in 5.1.2 (b) may not be declared if such bulk packages are intended for delivery to distributors of food manufacturers/institutional users, provided every shipment or delivery is accompanied by a document containing all information in 5.1.1. or 5.1.2.

5.3 Iodine levels based on WHO recommendation

In order to meet national needs, the prescribes levels of iodized salt be indicated below:

| | Type of container | Packages |
|---|-------------------|----------------|
| Sampling point | Bulk (>2 kg) | Retail (<2 kg) |
| Production site | 70-150 g/kg | 60-100 mg/kg |
| Port of entry* | 70-150 mg/kg | 60-100 mg/kg |
| Retail site | > 50 mg/kg | > 40 mg/kg |
| * For imported iodized salt, also at importer's/distributor warehouse | | |

6. Food additives

6.1 All additives used, including KIO and KI, and shall be of food grade quality and shall conform to the specifications prescribed by JECFA of the Food Chemicals Codex.

6.1.1 Anti-caking agents

Maximum level in the final product

6.1.1.1 Coating agents; Carbonate. Calcium/)
magnesium, Magnesium oxide; Phosphate,)
Tricalcium; Silicon dioxide, amorphous;)
Silicates, calcium , magnesium, sodium)
alumino or sodium or sodium calcium)
alumino)

20 g/kg singly or in
combination

6.1.1.2 Coating hydrophobic agents,)
aluminum, calcium, magnesium, potassium)
or sodium salts of myristic, palmitic or stearic)
acid)

6.1.1.3 Crystal modifiers: ferrocyanide,)
calcium, potassium combination or sodium)
)

10 mg/kg singly or in
combination, expressed
as {Fe(CN)}₂

6.1.2 Emulsifiers
Polysorbate 80

10 mg/kg

6.1.3 Processing Aid)
Dimethylpolysiloxane)

10 mg of residue/kg

7. Packaging

All iodized salt shall be packed in woven propylene bags, clean and unused jute bags, or other non-porous material with a lining of high density polyethylene to ensure the retention of appropriate iodine level at the time of consumption.

8. Storage, transport and display at retail

In order to minimize avoidable losses of iodine, iodized salt shall not be exposed to any of the following conditions during storage, transport and display at retail outlets:

- direct sunlight or near source of strong light;
- high temperature and humidity;
- contamination with moisture, e.g. rain, flood, etc.; and
- contamination with dust or filth from the environment.

Reference: Republic Act No. 8172: An Act Promoting Salt Iodization Nationwide and for Related Purposes and Its Implementing Rules and Regulations. Published by the National Nutrition Council, 1996.

Annex C

Standard parameters and values for drinking water
 Philippine National Standards for Drinking Water 2007 (DOH AO 2007-0012)

Table 1 – Standard values for bacteriological quality

| Parameter | Value/Unit | Point of compliance |
|--------------------------|------------------|---|
| Total coliform | < 1.1 MPN/100 ml | Service reservoir Water treatment works Consumers' taps Refilling stations Water haulers Water vending machines |
| Fecal coliform | < 1.1 MPN/100 ml | Service reservoir Water treatment works Consumers' taps Refilling stations Water haulers Water vending machines Point sources - Level 1 |
| Heterotropic plate count | < 500 CFU/ml | Service reservoir Water treatment works Consumers' taps nearest meter Refilling stations Water vending machines |

Table 2 – Standard values for physical and chemical quality for acceptability aspects for drinking water

| Constituents | Maximum level (mg/L) or Characteristic | Constituents | Maximum level (mg/L) or Characteristic |
|--------------|---|------------------------|--|
| Taste | No objectionable taste | Hydrogen sulfide | 0.05 |
| Odor | No objectionable odor | Iron | 1.0 |
| Color | Apparent = 10 color units True = 5 color units | Manganese | 0.4 |
| Turbidity | 3 NTU | pH | 6.5 – 8.5 |
| Aluminum | 0.2 | Sodium | 200 |
| Chloride | 250 | Sulfate | 250 |
| Copper | 1.0 | Total Dissolved Solids | 500 |
| Hardness | 300 as CaCO ₃ | Zinc | 5.0 |

Table 3 – Standard values for organic and inorganic chemical constituents of health significance in drinking water

| Inorganic chemical | Constituents | Maximum level (mg/L) | Constituents | Maximum level (mg/L) |
|--------------------|--|----------------------|----------------------------------|---------------------------|
| | Antimony | 0.02 | Fluoride | 1.0 |
| | Arsenic | 0.05 | Lead | 1.01 |
| | barium | 0.7 | Mercury (total) | 0.001 |
| | Boron | 0.5 | Nickel | 0.02 |
| | Cadmium | 0.003 | Nitrate | 50 |
| | Chromium (Total) | 0.05 | Nitrite | 3.0 |
| | Cyanide (Total) | 0.07 | Selenium | 0.01 |
| Organic chemical | Constituents | Maximum level (mg/L) | Constituents | Maximum level (mg/L) |
| | Benzene | 0.01 | Ethylbenzene | 0.30 |
| | Carbon tetrachloride | 0.004 | Nitrilotriacetic acid (NTA) | 0.20 |
| | 1,2-Dichlorobenzene | 0.1 | Polyaromatic hydrocarbons (PAHs) | 0.20 |
| | 1,4-Dichlorobenzene | 0.5 | Polynuclear aromatic | 0.0007 |
| | 1,2-Dichloroethane | 0.003 | Tetrachloroethene | 0.02 |
| | 1,1-Dichloroethene | 0.05 | Styrene | 0.04 |
| | 1,2-Dichloroethene | 0.07 | Tetrachloroethene | 0.70 |
| | Dichloromethane | 1.0 | Trichloroethene | 0.07 |
| | Di(2-ethylhexyl) phthalate | 1.01 | Vinyl chloride | 0.0003 |
| | Edetic Acid (ADTA) | 0.001 | Xylene | 0.5 |
| Organic pesticide | Constituents | | Maximum level (ug/L) | Status in the Philippines |
| | Aldrin and Dieldrin (combined) | | 30.0 | Banned |
| | Atrazine | | 0.03 | Registered |
| | Carbofuran | | 2.0 | Registered |
| | Chlordane | | 7.0 | Banned |
| | DDT ** | | 0.2 | Banned |
| | 1,2-Dibromo-3-chloropropane (DBCP) | | 1.0 | Banned |
| | 2,4-Dichlorophenoxyacetic acid (2,4-D) | | 1.0 | Registered |
| | Endrin | | 30. | Banned |
| | 1,2-Dibromomethane (Ethylene dibromide) | | 0.6 | Banned |
| | Heptachlor and Heptachlor epoxide (combined) | | 0.03 | Banned |
| | Lindane | | 2.0 | Restricted |
| | MCPA (4-(2-methyl-4-chloro) phenoxy) acetic acid | | 2.0 | Registered |
| | Pendimethalin | | 20.0 | Registered |
| | Pentachlorophenol (PCP) | | 9.0 | Banned |

Annex D

Comparative characteristics of fresh and stale fish

| Criteria | Fresh fish | Spoiled fish |
|-----------------------|---|--|
| 1. Body color | Normal bright, glossy and shiny | pale, faded or dull |
| 2. Rigidity of body | rigid or stiff | flabby or limp |
| 3. Eyes | clear, bright (cornea clear black), bulging or protruding | cloudy or completely white, wrinkled, sunken |
| 4. Scales | Adhere strongly | Loose |
| Gills' odor and color | bright red, fresh seaweedy odor | yellowish, gray or brown color, off-odor (stale or sour) |
| 6. Flesh | firm and elastic, springs back when pressed | very soft, finger impressions remain when pressed |
| 7. Skin | None to little slime | slimy, sometimes coagulated or lumpy |

Annex E

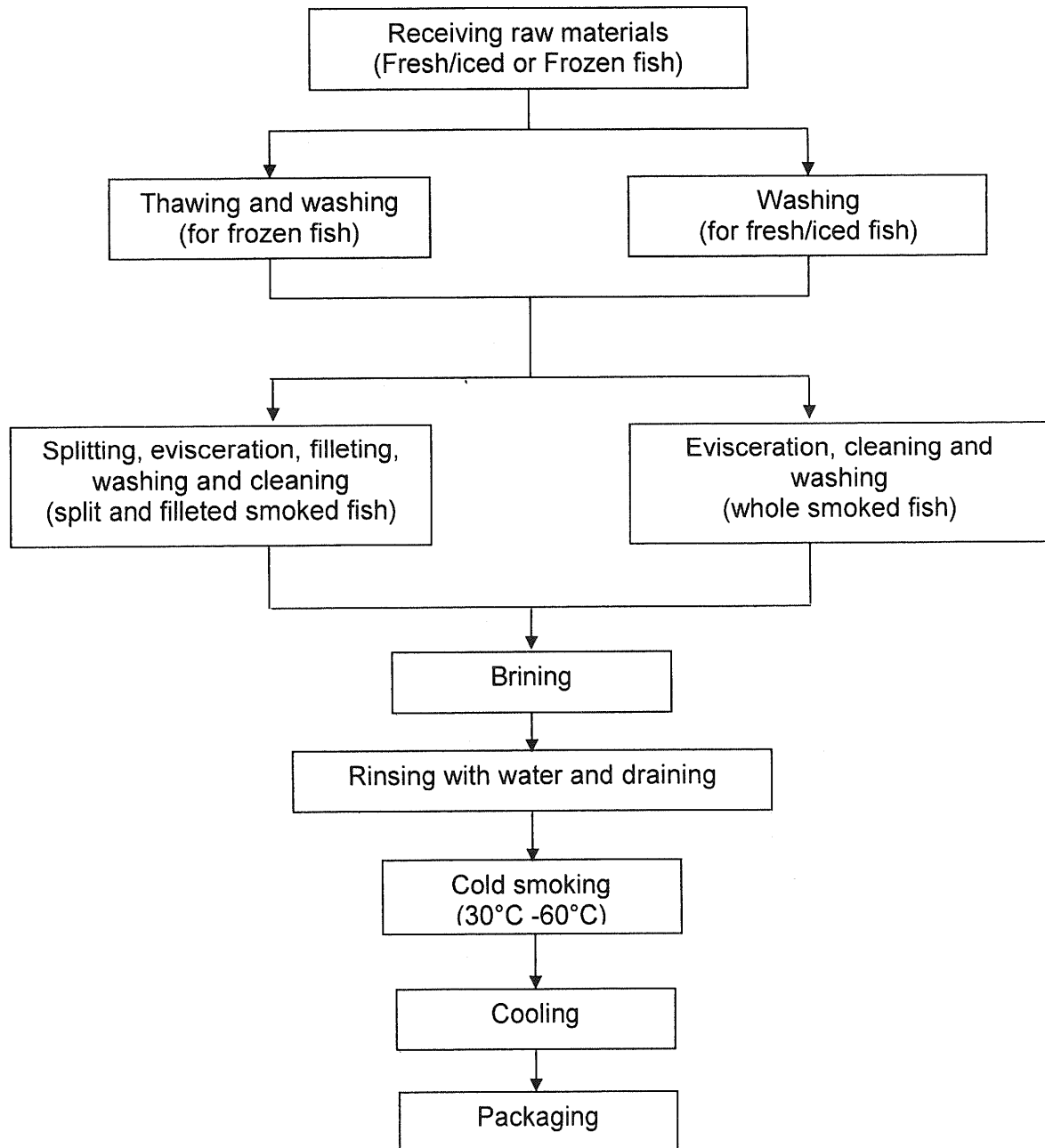
Preparation of brine of required strength

The amount of salt to be dissolved in water to obtain required brine strength: brine strength measured at 16°C (61°F)

| Specific gravity | Salt by weight (%) | Salinometer reading (°S) | Salt (kg) to be dissolved in 100 L water |
|------------------|--------------------|--------------------------|--|
| 1.007 | 1 | 3.8 | 1.0 |
| 1.014 | 2 | 7.6 | 2.0 |
| 1.022 | 3 | 11.4 | 3.1 |
| 1.029 | 4 | 15.2 | 4.3 |
| 1.037 | 5 | 19.0 | 5.3 |
| 1.044 | 6 | 22.7 | 6.4 |
| 1.051 | 7 | 26.5 | 7.5 |
| 1.058 | 8 | 30.3 | 8.7 |
| 1.066 | 9 | 34.1 | 9.9 |
| 1.073 | 10 | 37.9 | 11.1 |
| 1.081 | 11 | 41.7 | 12.4 |
| 1.089 | 12 | 45.5 | 13.6 |
| 1.096 | 13 | 49.3 | 14.9 |
| 1.104 | 14 | 53.1 | 16.3 |
| 1.112 | 15 | 56.8 | 17.6 |
| 1.119 | 16 | 60.6 | 19.0 |
| 1.127 | 17 | 64.6 | 20.5 |
| 1.135 | 18 | 72.0 | 22.0 |
| 1.143 | 19 | 75.8 | 23.5 |
| 1.151 | 20 | 79.6 | 25.0 |
| 1.159 | 21 | 83.4 | 26.6 |
| 1.168 | 22 | 87.2 | 28.2 |
| 1.176 | 23 | 91.0 | 29.9 |
| 1.184 | 24 | 94.8 | 31.6 |
| 1.192 | 25 | 98.5 | 33.3 |
| 1.201 | 26 | 100.0 | 35.1 |
| 1.204 | 26.4 | - | 35.9 |

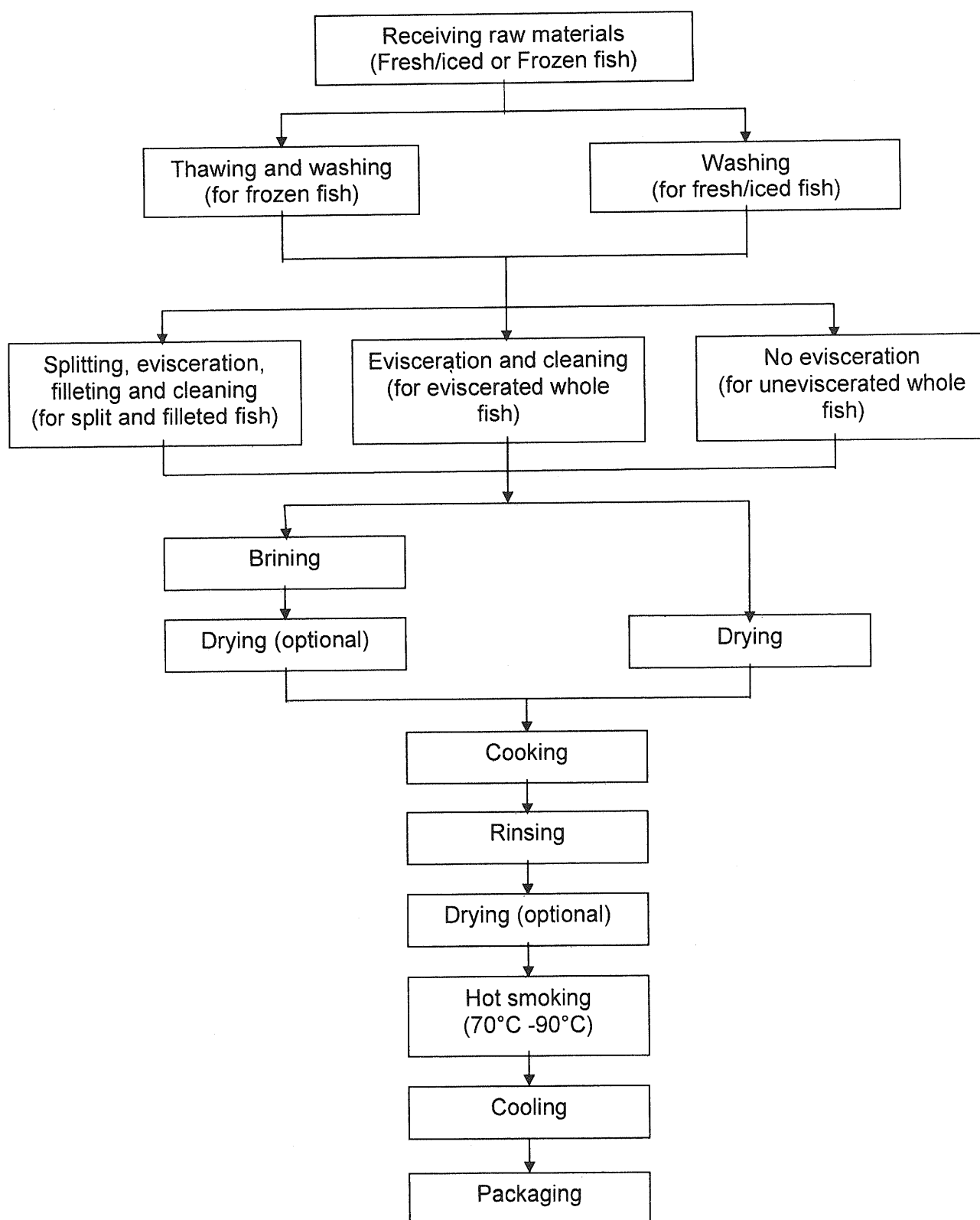
Annex F

General flow process in the processing of cold smoked fish



Annex G

General flow process in the processing of hot smoked fish



Annex H

Calculated water phase salt contents (WPS) at different moisture and salt contents

| Moisture content (%) | Salt content (as NaCl) (%) | | | | | | | | | |
|----------------------|----------------------------|------|------|------|------|-------|-------|-------|-------|-------|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| 51 | 1.92 | 3.77 | 5.56 | 7.27 | 8.93 | 10.53 | 12.07 | 13.56 | 15.00 | 16.39 |
| 52 | 1.89 | 3.70 | 5.45 | 7.14 | 8.77 | 10.34 | 11.86 | 13.33 | 14.75 | 16.13 |
| 53 | 1.85 | 3.64 | 5.36 | 7.02 | 8.62 | 10.17 | 11.67 | 13.11 | 14.52 | 15.87 |
| 54 | 1.82 | 3.57 | 5.26 | 6.90 | 8.47 | 10.00 | 11.48 | 12.90 | 14.29 | 15.63 |
| 55 | 1.79 | 3.51 | 5.17 | 6.78 | 8.33 | 9.84 | 11.29 | 12.70 | 14.06 | 15.38 |
| 56 | 1.75 | 3.45 | 5.08 | 6.67 | 8.20 | 9.68 | 11.11 | 12.50 | 13.85 | 15.15 |
| 57 | 1.72 | 3.39 | 5.00 | 6.56 | 8.06 | 9.52 | 10.94 | 12.31 | 13.64 | 14.93 |
| 58 | 1.69 | 3.33 | 4.92 | 6.45 | 7.94 | 9.38 | 10.77 | 12.12 | 13.43 | 14.71 |
| 59 | 1.67 | 3.28 | 4.84 | 6.35 | 7.81 | 9.23 | 10.61 | 11.94 | 13.24 | 14.49 |
| 60 | 1.64 | 3.23 | 4.76 | 6.25 | 7.69 | 9.09 | 10.45 | 11.76 | 13.04 | 14.29 |
| 61 | 1.61 | 3.17 | 4.69 | 6.15 | 7.58 | 8.96 | 10.29 | 11.59 | 12.86 | 14.08 |
| 62 | 1.59 | 3.13 | 4.62 | 6.06 | 7.46 | 8.82 | 10.14 | 11.43 | 12.68 | 13.89 |
| 63 | 1.56 | 3.08 | 4.55 | 5.97 | 7.35 | 8.70 | 10.00 | 11.27 | 12.50 | 13.70 |
| 64 | 1.54 | 3.03 | 4.48 | 5.88 | 7.25 | 8.57 | 9.86 | 11.11 | 12.33 | 13.51 |
| 65 | 1.52 | 2.99 | 4.41 | 5.80 | 7.14 | 8.45 | 9.72 | 10.96 | 12.16 | 13.33 |
| 66 | 1.49 | 2.94 | 4.35 | 5.71 | 7.04 | 8.33 | 9.59 | 10.81 | 12.00 | 13.16 |
| 67 | 1.47 | 2.90 | 4.29 | 5.63 | 6.94 | 8.22 | 9.46 | 10.67 | 11.84 | 12.99 |
| 68 | 1.45 | 2.86 | 4.23 | 5.56 | 6.85 | 8.11 | 9.33 | 10.53 | 11.69 | 12.82 |
| 69 | 1.43 | 2.82 | 4.17 | 5.48 | 6.76 | 8.00 | 9.21 | 10.39 | 11.54 | 12.66 |
| 70 | 1.41 | 2.78 | 4.11 | 5.41 | 6.67 | 7.89 | 9.09 | 10.26 | 11.39 | 12.50 |
| 71 | 1.39 | 2.74 | 4.05 | 5.33 | 6.58 | 7.79 | 8.97 | 10.13 | 11.25 | 12.35 |
| 72 | 1.37 | 2.70 | 4.00 | 5.26 | 6.49 | 7.69 | 8.86 | 10.00 | 11.11 | 12.20 |
| 73 | 1.35 | 2.67 | 3.95 | 5.19 | 6.41 | 7.59 | 8.75 | 9.88 | 10.98 | 12.05 |
| 74 | 1.33 | 2.63 | 3.90 | 5.13 | 6.33 | 7.50 | 8.64 | 9.76 | 10.84 | 11.90 |
| 75 | 1.32 | 2.60 | 3.85 | 5.06 | 6.25 | 7.41 | 8.54 | 9.64 | 10.71 | 11.76 |
| 76 | 1.30 | 2.56 | 3.80 | 5.00 | 6.17 | 7.32 | 8.43 | 9.52 | 10.59 | 11.63 |
| 77 | 1.28 | 2.53 | 3.75 | 4.94 | 6.10 | 7.23 | 8.33 | 9.41 | 10.47 | 11.49 |
| 78 | 1.27 | 2.50 | 3.70 | 4.88 | 6.02 | 7.14 | 8.24 | 9.30 | 10.34 | 11.36 |
| 79 | 1.25 | 2.47 | 3.66 | 4.82 | 5.95 | 7.06 | 8.14 | 9.20 | 10.23 | 11.24 |
| 80 | 1.23 | 2.44 | 3.61 | 4.76 | 5.88 | 6.98 | 8.05 | 9.09 | 10.11 | 11.11 |
| 81 | 1.22 | 2.41 | 3.57 | 4.71 | 5.81 | 6.90 | 7.95 | 8.99 | 10.00 | 10.99 |
| 82 | 1.20 | 2.38 | 3.53 | 4.65 | 5.75 | 6.82 | 7.87 | 8.89 | 9.89 | 10.87 |
| 83 | 1.19 | 2.35 | 3.49 | 4.60 | 5.68 | 6.74 | 7.78 | 8.79 | 9.78 | 10.75 |
| 84 | 1.18 | 2.33 | 3.45 | 4.55 | 5.62 | 6.67 | 7.69 | 8.70 | 9.68 | 10.64 |
| 85 | 1.16 | 2.30 | 3.41 | 4.49 | 5.56 | 6.59 | 7.61 | 8.60 | 9.57 | 10.53 |
| 86 | 1.15 | 2.27 | 3.37 | 4.44 | 5.49 | 6.52 | 7.53 | 8.51 | 9.47 | 10.42 |
| 87 | 1.14 | 2.25 | 3.33 | 4.40 | 5.43 | 6.45 | 7.45 | 8.42 | 9.38 | 10.31 |
| 88 | 1.12 | 2.22 | 3.30 | 4.35 | 5.38 | 6.38 | 7.37 | 8.33 | 9.28 | 10.20 |
| 89 | 1.11 | 2.20 | 3.26 | 4.30 | 5.32 | 6.32 | 7.29 | 8.25 | 9.18 | 10.10 |
| 90 | 1.10 | 2.17 | 3.23 | 4.26 | 5.26 | 6.25 | 7.22 | 8.16 | 9.09 | 10.00 |

$$\text{WPS (\%)} = \left[\frac{\% \text{ Salt content as sodium chloride}}{\% \text{ Salt content} + \% \text{ Moisture}} \right] \times$$

Annex I
Codex Alimentarius Sampling Plans for Prepackaged Foods (AQL 6.5)
(CAC/RM 42-1969)

Sampling plan no. 1 – Normal operations
Inspection level 1, AQL 6.5)

1. Net weight: ≤ 1 kg

| Lot size (N) | Sample size | Acceptance number (C) |
|-------------------|-------------|-----------------------|
| 4,800 or less | 6 | 1 |
| 4,801 – 24,000 | 13 | 2 |
| 24,001 – 48,000 | 21 | 3 |
| 48,001 – 84,000 | 29 | 4 |
| 94,001 – 144,000 | 48 | 6 |
| 144,001 – 240,000 | 84 | 9 |
| More than 240,000 | 126 | 13 |

2. Net weight: >1 kg ≥ 4.5 kg

| Lot size (N) | Sample size | Acceptance number (C) |
|-------------------|-------------|-----------------------|
| 2,400 or less | 6 | 1 |
| 2,401 – 15,000 | 13 | 2 |
| 15,001 – 24,000 | 21 | 3 |
| 24,001 – 42,000 | 29 | 4 |
| 42,001 – 72,000 | 48 | 6 |
| 72,001 – 120,000 | 84 | 9 |
| More than 120,000 | 126 | 12 |

3. Net weight > 4.5 kg

| Lot size (N) | Sample size | Acceptance number (C) |
|------------------|-------------|-----------------------|
| 600 or less | 1 | 1 |
| 601 – 2,000 | 13 | 2 |
| 2,001 – 7,200 | 21 | 3 |
| 7,201 – 15,000 | 29 | 4 |
| 15,001 – 24,000 | 48 | 6 |
| 24,001 – 42,000 | 84 | 9 |
| More than 42,000 | 126 | 13 |

**Sampling plan 2 - In case of disputes
Inspection level 2, AQL 6.5)**

1. Net weight: ≥ 1 kg

| Lot Size (N) | Sample size | Acceptance Number (C) |
|---------------------|--------------------|------------------------------|
| 4,800 or less | 13 | 2 |
| 4,801 – 24,000 | 21 | 3 |
| 24,001 – 48,000 | 29 | 4 |
| 48,001 – 84,000 | 48 | 6 |
| 94,001 – 144,000 | 84 | 9 |
| 144,001 – 240,000 | 126 | 13 |
| More than 240,000 | 200 | 19 |

2. Net weight: >1 kg ≥ 4.5 kg

| Lot Size (N) | Sample size | Acceptance Number (C) |
|---------------------|--------------------|------------------------------|
| 2,400 or less | 13 | 2 |
| 2,401 – 15,000 | 21 | 3 |
| 15,001 – 24,000 | 29 | 4 |
| 24,001 – 42,000 | 48 | 6 |
| 42,001 – 72,000 | 84 | 9 |
| 72,001 – 120,000 | 126 | 13 |
| More than 120,000 | 200 | 19 |

3. Net weight > 4.5 kg

| Lot Size (N) | Sample size | Acceptance Number (C) |
|---------------------|--------------------|------------------------------|
| 600 or less | 13 | 2 |
| 601 – 2,000 | 21 | 3 |
| 2,001 – 7,200 | 29 | 4 |
| 7,201 – 15,000 | 48 | 6 |
| 15,001 – 24,000 | 84 | 9 |
| 24,001 – 42,000 | 126 | 13 |
| More than 42,000 | 200 | 19 |

Source: Codex Alimentarius Sampling Plans for Prepackaged Foods -
CAC/RM 42-1969, Codex Alimentarius Volume 13.

Annex J
Determination of net weight

1. Apparatus

Weighing balance (sensitivity: 0.10 gram)

2. Procedure

2.1 Weigh the sample unit on its original sample packed container. This is the gross weight.

2.2 Open and transfer the contents of each individual package. Wash the empty package and blot dry.

2.3 Weigh out the washed empty package. This is the weight of the packaging material.

2.4 Subtract the weight of the empty package from the gross weight. The resulting figure is the net weight of the individual package (net weight = gross weight – weight of packaging).

2.5 Average the results from all package of a sample representing a lot. Report result as the average net weight of the product.

Food Industry/Professional/Consumer Association:

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| Valentine Apolinario | - | Integrated Food Manufacturers' Assn. of the Philippines for Productivity |
| Benjamin Quitasol | - | Philippine Food Processors and Exporters Organization, Inc. |
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| Irma Biboso | - | Nationwide Assn. of Consumers, Inc. |

Food Industry

- | | | |
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| Elvira Ogsimer | - | Fitrite, Inc. |
| Marilou Florendo | - | Pacific Isles, Int'l. Trading, Inc. |
| Imee Guinto | - | MCP Salinas Smoked Fish |

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PNS/FDA 27:2010

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FORMULATING BODY
Development of Standards for Smoked Fish

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